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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/674,242

10/27/2000

Susumu Hizukuri

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04/08/2003

MACCORD MASON PLLC  
300 N. GREENE STREET, SUITE 1600  
P. O. BOX 2974  
GREENSBORO, NC 27402

EXAMINER

LEWIS, PATRICK T

ART UNIT

PAPER NUMBER

1623

12

DATE MAILED: 04/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/674,242

Applicant(s)

HIZUKURI ET AL.

Examiner

Patrick T. Lewis

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1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7,8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7,8 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

#### ***Objection/Rejections as Set Forth in the Office Action dated November 5, 2002***

1. Claims 3 and 9 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claims 1, 3, 5, 7, and 9-10 were rejected under 35 U.S.C. 102(b) as being anticipated by Schiweck et al. U.S. Patent 4,816,078 (Schiweck).
3. Claim 8 was rejected under 35 U.S.C. 102(b) as being anticipated by Gatzki et al. *Helv. Chim. Acta.* (1938), 21, 195-205 (Gatzki).
4. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiweck et al. U.S. Patent 4,816,078 (Schiweck), Weibel U.S. Patent 4,831,127 (Weibel-1), and Weibel U.S. Patent 5,008,254 (Weibel-2).

#### ***Response dated January 16, 2003***

5. In the amendment filed January 16, 2003, claims 1, 8, and 10 were amended. Claims 3, 5, 6, and 9 were canceled.. An action on the merits of claims 1, 2, 4, 7, 8, and 10 is contained herein below.
6. In regards to the Rejection under 35 U.S.C. 112, second paragraph, applicant's amendments filed January 16, 2003 have been fully considered and have overcome the rejection set forth by the examiner in the Office Action dated November 5, 2002.

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7. The rejection of claim 8 under 35 U.S.C. 102(b) as being anticipated by Gatz et al. *Helv. Chim. Acta* (1938), 21, 195-205; the rejection of claims 1, 3, 5, 7, and 9-10 under 35 U.S.C. 102(b) as being anticipated by Schiweck et al. U.S. Patent 4,816,078; and the rejection of claims 1-6 under 35 U.S.C. 103(a) as being unpatentable over Schiweck et al. U.S. Patent 4,816,078 (Schiweck), Weibel U.S. Patent 4,831,127 (Weibel-1), and Weibel U.S. Patent 5,008,254 (Weibel-2) has been rendered moot in view of new grounds of rejection.

### ***Claim Objections***

8. Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 is drawn to a process for the manufacture of L-arabinose. Claim 8 is drawn to a method to produce a sugar alcohol containing L-arabitol. The additional limitations recited in claim 8 do not limit the process for manufacturing L-arabinose, but rather introduces an additional step to produce a materially different product.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1, 2, 4, 7, 8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schiweck et al. U.S. Patent 4,816,078 (Schiweck) in combination with all of the following viewed collectively: Weibel U.S. Patent 4,831,127 (Weibel-1); Weibel U.S. Patent 5,008,254 (Weibel-2); Shibamura et al. *J. Appl. Glycosci.*, Vol. 46, pages 249-256 (Shibamura); and Gatzert et al. *Helv. Chim. Acta.* (1938), 21, 195-205 (Gatzert).

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Claims 1, 2, 4, 7, 8, and 10 are drawn to a process for the manufacture of L-arabinose by acid hydrolysis of a vegetable fiber wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more.

Schiweck teaches a process for the production of crystalline L-arabinose from araban containing plant material, especially beet araban which was isolated from beet pulp after sugar extraction. The method as taught by Schiweck comprises the mild acid hydrolysis of beet pulp at a temperature of 92 to 97 °C for 70 minutes wherein the sulfuric acid concentration is 0.5 to 2.0% (w/w) (column 2, lines 19-60) as instantly claimed. As any artisan in the field would be aware of, the sulfuric acid concentration when converted to normality is 0.1 N to 0.4 N. L-Arabinose is nearly extracted completely while other carbohydrates such as galactose, rhamnose, and galacturonic acid remain in oligomeric/polymeric forms (column 2, lines 29-32). The solution is then neutralized, filtered to remove any precipitates, and concentrated. The purity of the L-arabinose is 85 to 89% at this point (column 2, lines 38-41). The solution is then concentrated further, cooled to room temperature to crystallize the L-arabinose, and recrystallized from water (column 2, lines 45-60).

Schiweck does not teach the use of a vegetable fiber but rather teaches the use of sugar beet pulp. Schiweck does not disclose the weight percentage of L-arabinose present in the sugar beet fiber. Schiweck also does not disclose the solid concentration

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of the sugar beet fiber prior to hydrolysis or the percent composition of the saccharides decomposed during hydrolysis.

Weibel-2 discloses the composition of beet pulp as being largely L-arabinose, D-galactose, and D-galacturonic acid (column 3, lines 21-25) with over 70% of the pectin being L-arabinose and D-galacturonic acid (column 5, lines 42-46). Pectin is the generic term for the dominant polysaccharide (column 3, lines 25-26). Please note that D-galactose and D-galacturonic acid described in Weibel-2 are unnecessary components to attain the object of the present invention, applicant is reminded that the transitional phrase "characterized" is open-ended and, as such, does not exclude the galactose and D-galacturonic acid described in Weibel-2.

Weibel-1 discloses a method for isolating biopolymers from sugar beet pulp. Weibel-1 discloses the beet pulp being made into a slurry of about 4 to 12% total solids and then hydrolyzed under mild acidic conditions wherein the concentration of the acid (HCl) was 0.01 to 0.10 N (column 17, lines 48-57). The pulp material was recovered quantitatively with 50% being in a particulate form and 50% solubilized (column 14, lines 16-19). After hydrolysis and removal of solid particulates, the solution is concentrated containing about 50% arabinogalactan, about 40% pectin, and about 10% other polymers (column 14, lines 28-37). Arabinogalactan and pectin were estimated by the concentration of L-arabinose plus D-galactose and D-galacturonic acid respectively (column 16, lines 34-37).

Shibanuma teaches an analogous method for the mild partial acid hydrolysis of corn fiber for the production of L-arabinose (Abstract). Prior to hydrolysis, starch was

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removed from the fiber by treatment with  $\alpha$ -amylase. About 50-60% of L-arabinose was liberated in the destarched corn fiber (DSCF) using 0.2 N oxalic acid or 0.1 N sulfuric acid at 100 °C for 3 hours. The amounts and degree of polymerization of the oligosaccharides produced were 43%, DP 15.8 and 38%, DP 7.9 when using oxalic acid and sulfuric acid, respectively.

Gatzi teaches the catalytic hydrogenation of L-arabinose using Raney Ni and H<sub>2</sub> to produce L-arabitol (English Abstract). The method by which the L-arabinose was produced does not render the method of Gatzi unobvious.

It would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture L-arabinose by acid hydrolysis of a vegetable fiber wherein the concentration of the acid is 0.01 to 0.05 N, the temperature is 80-150 °C, and the total amount of saccharides decomposed and eluted during hydrolysis is 30% or more on the basis of the dry substance and the proportion of L-arabinose in the total amount of acid-hydrolyzed monosaccharides is 50% or more as general methodological steps as claimed are known in the art. The choice of a suitable starting material is seen to be well within the purview of the skilled artisan. One would have been motivated to combine the teachings of the prior art in order to increase the yield of the L-arabinose isolated by the process. Weibel-2 teaches that higher acid concentrations increase the rate of degradation of pectin. The quest for higher yields of L-arabinose is deemed to be sufficient motivation for combining the teachings of the prior art.



**Conclusion**

13. Claims 1, 2, 4, 7, 8, and 10 are pending. Claims 1, 2, 4, 7, 8, and 10 are rejected. No claim is allowed.

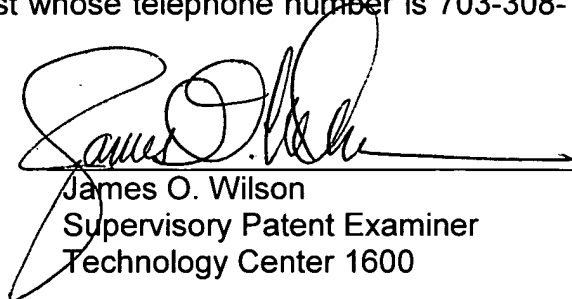
**Contacts**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick T. Lewis whose telephone number is 703-305-4043. The examiner can normally be reached on M-F 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 703-308-4624. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.

Patrick T. Lewis, PhD  
Examiner  
Art Unit 1623



James O. Wilson  
Supervisory Patent Examiner  
Technology Center 1600

ptl  
April 7, 2003